



A report by:

THE JOINT LEGISLATIVE STAFF
TASK FORCE ON GOVERNMENT OVERSIGHT

The battle over California's use of

MTBE



A briefing paper

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The Battle Over California's Use of MTBE

A BRIEFING PAPER FOR MEMBERS OF THE LEGISLATURE

California has some of the worst air pollution in the country. Even though our motor vehicle emissions are the lowest in the nation and our industries are among the cleanest, we have two unique problems which contribute to our pollution:

- We have more cars per capita than anywhere else in the world; and
- An unusual combination of topography and weather create smog more freely than nearly anywhere else on earth.

Our smoggiest areas (the Los Angeles Basin, the Central Valley, and the San Francisco Bay area) receive daily winds from the Pacific Ocean. The mountains surrounding these areas keep stagnant air trapped under layers of warm air in the upper atmosphere. When pollutants¹ in this trapped air are exposed to sunshine, a chemical reaction takes place which then forms ground-level ozone, commonly known as “smog.”

Air pollution in California was first reported in the early 1940s, when “brown clouds” settled over some of our cities and people reported watery eyes, coughing, and burning lungs. In 1947, California's then-Governor Earl Warren signed into law the California Air Pollution Act – the nation's first program to monitor and control air pollution. It was not until 1955 that the federal government enacted comparable legislation.

In its search for cleaner air, California developed catalytic converters, instituted the Smog Check program, and worked with automobile manufacturers to build fuel-efficient vehicles. It also developed “Cleaner-Burning Gasoline.” It is an ingredient of this gasoline, MTBE, which is causing so much controversy, not only in California but also around the world, because MTBE is polluting water supplies. While the actual health effects of MTBE are unknown, the cost of cleaning up MTBE-contaminated water supplies is exorbitant.

The following report attempts to explain the use of oxygenates, including MTBE, in California's gasoline and some of the effects of MTBE on our health and environment.

¹ Exhaust from motor vehicles is the main source of these pollutants.

INTRODUCTION

Federal law has required the use of oxygenates in gasoline in some areas of California since 1992, and state law has required the use of “Cleaner-Burning Gasoline,” which includes an oxygenate, in all of California since 1996. This fuel was developed pursuant to federal and state regulations to reduce motor vehicle emissions that cause air pollution. It is estimated that 50 percent of air pollutants come from motor vehicle emissions.²

California’s Cleaner-Burning Gasoline has greatly reduced health risks from exposure to toxic gasoline fumes and automobile exhaust and, according to the Air Resources Board (ARB), one of the most toxic components of automobile emissions, benzene, has been reduced by 30 to 40 percent.³ This Cleaner-Burning Gasoline was reported in 1996 to be responsible for an 18 percent improvement in the ozone level in southern California and a 10 percent improvement in the ozone level in the Bay Area and Sacramento.⁴

Health Effects of Gasoline Pollutants

Motor vehicle emissions contain numerous pollutants and toxic substances, such as carbon monoxide, sulfur dioxide, benzene, xylene, toluene, nitrogen oxides, volatile organic compounds, 1,3-butadiene, formaldehyde, and acetaldehyde. Some of these pollutants can cause eye irritation, sore throats, coughing, lung tissue damage, respiratory problems, and cancer.

To better understand the effects of these pollutants, it should be noted that the U.S. Environmental Protection Agency (U.S. EPA) classifies cancer-causing agents as follows: “known carcinogen,” “probable carcinogen,” and “possible carcinogen.” The U.S. EPA lists benzene as a known carcinogen, while 1,3-butadiene, formaldehyde, and acetaldehyde are classified as probable carcinogens. MTBE is considered as a possible carcinogen.

Carbon Monoxide

Carbon monoxide (CO) is an odorless deadly gas that is absorbed through the lungs and impairs the ability of blood to carry oxygen throughout the body. It is especially dangerous to expectant mothers and people with heart or lung ailments.

² Clean Fuels Development Coalition, *RFG Reformulated Gasoline: The Healthy Difference* (undated brochure); and *San Francisco Chronicle*, “Poor Air Quality Rating Riles Officials” (8/20/97), p. A18, states that more than 50 percent of the Bay Area’s pollutants are from cars and trucks.

³ Air Resources Board, *Cleaner Burning Gasoline* (undated brochure)

⁴ Air Resources Board, *MTBE Fact Sheet, Revision Released: May 1997*, Internet site: <http://www.calepa.cahwnet.gov/epadocs/osmtbefs.txt>

CO forms constantly, but during cold weather it can increase by up to 500 percent at ground level.⁵ This increase is caused by temperature inversions that trap pollutants closer to the ground in winter and hinder their dispersal. Also, starting a cold motor vehicle engine produces more CO emissions than starting a warm engine.

Ground-level ozone

Ground-level ozone, or “smog,” contains, among other things, volatile organic compounds and oxides of nitrogen (NO_x), and is more prevalent in warm weather. Smog can stunt the growth of vegetation, turn it brown, and more importantly, scar lungs and cause biochemical changes to red blood cells.

Benzene

This colorless gas is one of the ingredients that replace lead in gasoline. It is a year-round hazard that enters the atmosphere through motor vehicle exhaust and also through evaporation, especially during refueling. It is a known carcinogen and causes leukemia.⁶

MTBE

The health effects of MTBE have not yet been established by any reputable source. Some consumers have complained of nausea, headaches, dizziness, and rashes, but these symptoms have not been documented to be the result of MTBE exposure. However, MTBE can cause cancer in laboratory mice and rats, and the U.S. EPA considers it to be a “possible” human carcinogen. MTBE has a strong turpentine-like odor and taste, which allows it to be easily detected.

What Are Oxygenates?

Oxygenates are octane enhancers that are used to replace lead in gasoline. The federal Clean Air Act Amendments of 1990 and the federal reformulated gasoline program went into effect in 1992, requiring the addition of oxygenates to gasoline in certain areas of the country with the highest amounts of ground-level ozone.⁷ The most popular oxygenates are MTBE and ethanol, but there are also ETBE, TAME, TBA, and DIPE.

Oxygenates help fuels burn cleaner and more completely, thereby reducing tailpipe emissions that produce smog. They reduce air pollutants such as carbon monoxide, carbon dioxide, and sulfur oxides. In addition, oxygenates replace or dilute some toxic compounds in gasoline, such as benzene. This cleaner-burning gasoline containing oxygenates is called “reformulated gasoline” (RFG).

⁵ Clean Fuels Development Coalition, *RFG Reformulated Gasoline: The Healthy Difference*

⁶ Air Resources Board News Release No. 96-16 (7/2/96)

⁷ The *Clean Air Act* and the *Clean Air Act Amendments of 1990* require an oxygen content of 2.7% for all gasoline sold in areas which have not reduced carbon monoxide to specified levels. The 2.7% oxygen content is obtained by adding either 15% MTBE or 7.5% ethanol (by volume) to the gasoline.

An additional benefit of adding oxygenates is that they increase our petroleum output, which in turn reduces our dependency on other nations for oil. Current use of RFG in the United States reduces our need for approximately 300,000 barrels of oil per day.⁸

What are Aromatic Hydrocarbons?

The term “aromatic hydrocarbons” (also called “aromatics”) covers a group of ingredients that are added to gasoline to replace lead. These ingredients include benzene, toluene, and xylene. Benzene, considered to be one of the worst air toxics, is classified as a “known carcinogen” by the U.S. EPA. Xylene emissions from motor vehicle exhaust form smog when exposed to sunlight. During the combustion process in motor vehicles, toluene transforms into benzene. Because these ingredients are so toxic, the Clean Air Act Amendments of 1990 required, among other things: (1) the reduction of benzene; (2) a limit on the amount of aromatics used; and (3) the addition of larger amounts of oxygenates to gasoline.

CALIFORNIA’S REFORMULATED GASOLINE

Phase 1 of the Cleaner-Burning Gasoline regulations adopted by the California Air Resources Board (ARB) became effective in January 1992. It required detergent additives and reduced the Reid vapor pressure⁹ in gasoline. Phase 2 went into effect on March 1, 1996, and requires that all gasoline sold in the state must meet certain specifications for the following properties: Reid vapor pressure, benzene content, aromatic hydrocarbon content, sulfur content, olefinic hydrocarbon content, T50, T90, and oxygen content. The technical specifications are listed in Appendix A.

Most experts agree that California’s RFG is the cleanest-burning fuel in the world. The ARB estimates that statewide use of this fuel is comparable to removing 3.5 million cars from our highways and reduces pollution by the following amounts:¹⁰

Smog-forming emissions	300 tons per day
Sulfur Dioxide	30 tons per day
Carbon Monoxide	1,300 tons per day

⁸Douglas A. Durante, Executive Director, Clean Fuels Development Coalition, presentation before the United Nations Commission on Sustainable Development, New York, NY, April 23, 1996.

⁹A measure of how quickly gasoline evaporates.

¹⁰Air Resources Board, *Cleaner Burning Gasoline*

When RFG was first introduced, many experts predicted a drastic price increase at the pump. However, prices increased by only 5 to 8 cents per gallon in California. There were also predictions that fuel mileage would be greatly reduced, but the actual reduction has been only 1 to 3%.¹¹

Consumers originally were concerned that RFG would adversely affect the performance of their vehicles and other gasoline-powered engines. As a result, an advisory panel (made up of representatives of government agencies, refineries, vehicle manufacturers, service station operators, and others) was formed to evaluate tests performed on RFG. Additionally, Chevron, Texaco, General Motors, Ford, Nissan, Harley-Davidson, and other companies conducted their own tests of RFG on automobiles, motorcycles, construction and industrial equipment, farm equipment, lawnmowers, boats, snowmobiles, and all-terrain vehicles. To date, no valid performance problems due to the use of RFG have been reported.

CALIFORNIA'S CHOICE OF MTBE

The actual ingredients for California's RFG are not mandated, so refineries are free to choose their own ingredients, as long as the finished product meets certain criteria. California's refineries reportedly chose MTBE for the following reasons:

- ✓ It is economical;
- ✓ It is easy to use; and
- ✓ The supply is adequate.

The petroleum industry also has another reason for encouraging the use of MTBE -- it is a petroleum byproduct!

The specifications for California's cleaner-burning gasoline were developed by the ARB, which is under the jurisdiction of CalEPA. Although ARB's original specifications did not include oxygenates, federal regulations require the addition of oxygenates up to 2.7 wt % as blending agents in gasoline.

To determine the most effective method of reducing CO without increasing other ozone ingredients, the ARB performed daily tests for three years in California's ten air basins. The results of these tests were used in determining the specifications for California's Cleaner-Burning Gasoline. In the summer of 1992, the Modeling and Meteorology Branch of ARB determined that using the federal program requirements would decrease CO emissions in California by approximately 15 percent, but increase NO_x emissions by approximately 5 percent.¹²

¹¹ "High-octane controversy," *San Jose Mercury News*, May 27, 1997; and National Science and Technology Council, *Interagency Assessment of Oxygenated Fuels* (June 1997), p. 3-19.

¹² Don McNerny, Chief, Modeling and Meteorology Branch, ARB, memo to Dean Simeroth, Chief, Criteria Pollutants Branch, ARB (8/5/92)

CalEPA submitted a request, in October 1992, to the U.S. EPA for a waiver to reduce California's oxygenate requirements to a minimum of 1.8 wt % and a maximum of 2.2 wt %, because Cal-EPA felt the higher percentage could increase the risk of NO_x. Included with the request was a technical report detailing the results of the three-year tests.¹³ The U.S. EPA assigned a "Docket Number" to the request, but made no response. Thereafter, in June 1993, the ARB submitted another request to the U.S. EPA, by letter dated June 17, 1993, and enclosed a supplemental technical document¹⁴ explaining ARB's findings on NO_x increases. To date, the U.S. EPA has not formally responded to CalEPA's request.

Previously, California law¹⁵ allowed the use of up to 10% ethanol in gasoline. But shortly before the federal regulations went into effect, the ARB adopted regulations¹⁶ lowering to 2.2 wt % the maximum oxygenate content to be used in gasoline during the winter months, beginning in November 1992. This means that only 5.7% ethanol can be used.¹⁷ Therefore, substantially more MTBE can be used (11% MTBE compared to 5.7% ethanol) and the production of gasoline is increased. The National Research Council recommends that, when ethanol is used as an oxygenate, at least 7.5% be used.

¹³ ARB, *California Wintertime Oxygenates Program, Technical Support Document* (10/92)

¹⁴ ARB, *State of California Request for Waiver of the Minimum Oxygen Content Requirements for Wintertime Gasoline, Pursuant to Federal Clean Air Act Section 211(m)(3)(A), Supplemental Submittal to U.S. EPA, Docket No. A-93-13* (June 17, 1993)

¹⁵ SB 1166 (Hill, 1991)

¹⁶ Title 13, *California Code of Regulations*, Section 2258

¹⁷ According to a U.S. EPA press release dated 3/18/96,
2.2 wt % oxygenate = 5.7% ethanol and 11% MTBE
2.7 wt % oxygenate = 7.2% ethanol and 15% MTBE;
4.0 wt % oxygenate = 10% ethanol

CONTROVERSY OVER NITROGEN OXIDES (NO_x)

When exposed to sunlight, NO_x combines with volatile organic compounds¹⁸ to create ground-level ozone, better known as “smog.” Federal law prohibits an increase in NO_x, whether or not oxygenates are used in gasoline. But there has been nationwide controversy over whether or not oxygenates increase NO_x.

Among those who believe oxygenates do increase NO_x are the following:

Auto/Oil Air Quality Improvement Research Program	<i>Technical Bulletin No. 6</i> (1991) indicated that E10 [an oxygen-ethanol fuel] increased NO _x by 1 - 9.2% and MTBE increased NO _x by 1.8 - 10%
CalEPA	In a letter addressed to Honorable Bill Lockyer dated 5/28/97, John Dunlap, III, Chairman of the Air Resources Board, states, “The reason for the oxygen content cap is that higher amounts of oxygen increase emissions of oxides of nitrogen (NO _x), one of the key ingredients of smog. These NO _x increases are confirmed by the extensive database used to develop the California Predictive Model ...” (p. 2)
CalEPA	<i>MTBE: Briefing Paper Prepared by the California Environmental Protection Agency</i> , dated 4/24/97 (updated 6/2/97), states, “However, because of the adverse effect of higher levels of oxygenates on oxides of nitrogen (NO _x) emissions, California requested an EPA waiver from the basic 2.7 percent oxygen (15 percent MTBE) requirement in the FCAA and only required 2 percent oxygen (11 percent MTBE) in its winter gasoline.” (p. 5)
ARB	Chris Reynolds, ARB representative, stated in telephone interviews that, if 2.7% oxygenates were used in California, there would be an increase in NO _x , especially in summer. (Telephone interviews conducted by staff of the Joint Legislative Staff Task Force on Government Oversight, 6/30/97 and 8/14/97)

¹⁸Organic pollutants found in motor vehicle emissions that result from combustion and evaporation of fuels.

Among those who believe oxygenates do not increase NO_x are:

U.S. EPA	Announced 3/96 that use of oxygenates up to 4.0% produces no change in NO _x
Clean Fuels Development Coalition	In a statement before the United Nations Commission on Sustainable Development, Douglas A. Durante, Executive Director, stated, "Until recently, a general misconception existed that oxygenates increased NO _x in RFG."
Automobile Testing Laboratories and Radian Corporation	A 2/94 report prepared for ARB and South Coast Air Quality Management District, states, "The present data, in most cases, show that the oxygenates produced no significant change in NO _x versus the non-oxygenated base fuel." (Executive Summary, p. xv)

A recent White House report¹⁹ states that some studies do indicate an increase in NO_x emissions when using oxygenate concentrations above 2%.

Sylvia Dugre, of the U.S. EPA, has advised that California and the U.S. EPA use different databases in their predictive (mathematical) models for measuring NO_x, which may create a difference of opinion regarding safety levels of oxygenates.²⁰

COMPARISON OF OXYGENATES

MTBE

Methyl tertiary butyl ether (MTBE) is made from methanol (an alcohol) and a petroleum refining product called isobutylene. It is easily blended with other gasoline components and is easy to transport in existing distribution systems. When 11% MTBE (the amount currently used in California) is blended into gasoline, the amount of finished product is increased by 11%, thereby increasing our gasoline production. MTBE also reduces the temperature at which gasoline evaporates, which helps gasoline meet the T50 and T90 cleaner-burning gasoline requirements.²¹

¹⁹National Science and Technology Council, *Interagency Assessment of Oxygenated Fuels* (Washington, DC: June 1997)

²⁰ Telephone interview (7/8/97)

²¹T50 and T90 refer to the temperatures at which 50% and 90% of gasoline evaporates. These temperatures affect engine performance.

However, it must be pointed out that few, if any, tests have been done on MTBE at temperatures below 50 degrees Fahrenheit, so little is known about its effectiveness at lower temperatures.

MTBE is used in approximately 30% of the gasoline consumed in the United States, according to CalEPA, and virtually all the gasoline consumed in California.

Numerous studies, both here and abroad, have been done on the health effects of MTBE. According to CalEPA, the 70-year lifetime potential cancer risk from MTBE air exposure is one to two cases per million. General cancer risks in California from air toxics average 500 cases per million.²² A National Science and Technology report²³ states that chronic, noncancerous health effects (e.g., neurological, developmental, or reproductive problems) are not likely to occur from exposure to MTBE. While the National Science and Technology report found no published studies on the carcinogenic effects on humans, it does state that MTBE should be regarded as having a human health hazard potential because of its numerous uncertainties.

This summer, Governor Pete Wilson signed SB 521 (Mountjoy)²⁴ that gives the University of California a half million dollars to research human health and environmental risks of MTBE. The bill also requires the Governor to determine, based on the results of this study, whether or not to continue using MTBE.

Ethanol

Ethanol is an alcohol made from organic ingredients, usually corn, but it can also be made from wheat, agricultural waste, timber byproducts, rice straw, etc. It is not a carcinogen; in fact, if you add water and an olive to ethanol, you've got a martini! Some states (Nevada, Alaska, Wisconsin, Michigan, and Illinois) use 100% ethanol fuels.

When used as an oxygenate, ethanol reduces motor vehicle emission pollutants in amounts similar to the reductions made by the use of MTBE. **Most importantly, it will not pollute groundwater.**

Ethanol does have drawbacks, however. When blended into gasoline, ethanol increases vapor pressure more than MTBE; thus, less ethanol can be used, which means lower production of the finished product. Ethanol also has a blending problem not encountered with MTBE -- when gasoline blended with ethanol comes into contact with water, the ethanol and water will combine into a separate phase and separate from the gasoline. Therefore, experts recommend that blending should be done at the terminals to prevent the possibility of this separation. In addition, ethanol evaporates faster in hot weather than MTBE.

²²Cal-EPA, *MTBE: Briefing Paper prepared by the California Environmental Protection Agency*, Sacramento, April 24, 1997 (updated June 2, 1997), pp. 1, 13.

²³ *Interagency Assessment of Oxygenated Fuels*

²⁴ Chapter 816, *Statutes of 1997*

Currently, the use of ethanol as an oxygenate in California is not economical because of the oxygen limit of 2.2 wt %, which equals 5.7% ethanol. The National Research Council recommends using at least 7.5% ethanol, and some research groups recommend a minimum of 10 to 11%.

The nationwide supply of ethanol is inadequate to meet California's needs if the state should decide to allow its use as an oxygenate.²⁵ In addition, petroleum refineries and terminals would have to be restructured. According to the Clean Fuels Development Coalition, California does have a few operating ethanol plants, plus a supply of rice straw that could be converted to ethanol. Therefore, ethanol could be introduced gradually into the market. However, gasoline containing ethanol will undoubtedly cost more to produce than gasoline containing MTBE for several reasons: ethanol is more difficult to work with; the supply will have to be developed; and production of the finished product will be diminished because less ethanol can be used.²⁶

Other Oxygenates

Ethyl tertiary-butyl ether (ETBE) and tertiary-amyl methyl ether (TAME) have benefits similar to MTBE and ethanol, but present more production problems to refiners. ETBE, which is a combination of ethanol and butanes from natural gas liquids, is generally preferred over TAME. It has a lower vapor pressure and is easier to transport than ethanol. Tertiary-butyl alcohol (TBA) does not comply with volatility specifications and, therefore, cannot be used in California. Insufficient data is available concerning diisopropyl ether (DIPE) to make a comparison with other oxygenates.

Very few studies have been done on the health effects of ETBE, TAME, TBE and DIPE, so it is unknown whether they are more or less toxic than MTBE.

Last May, the Legislature requested the Energy Commission to conduct a study to evaluate alternatives that could take the place of MTBE in California's RFG. The Energy Commission's study is to include, among other things: (1) an evaluation of air quality and environmental benefits of each alternative compared to MTBE; (2) an estimate of potential costs or savings in the price of retail gasoline when using the alternatives, compared to using MTBE; (3) an evaluation of the availability of each alternative; and (4) an estimate of the time frame in which the alternatives could be substituted for MTBE without a major disruption of our supply of gasoline.

The Energy Commission's report was to be completed by January 10, 1997, but a commission spokesman has advised the report will not be completed until March 1997.

²⁵ Telephone interview with Douglas A. Durante, Executive Director, Clean Fuels Development Coalition (July 11, 1997)

²⁶ CalEPA, *MTBE: Briefing Paper prepared by the California Environmental Protection Agency*, April 24, 1997 (updated June 2, 1997), p. 4; and *San Francisco Chronicle*, "Gas Additive's Needless Risk," (September 15, 1997)

DRINKING WATER CONTAMINATION BY MTBE

“The key to reducing gasoline components, including MTBE, in water sources is improved underground gasoline storage tank leak prevention and early detection.”²⁷

The National Science and Technology Council states that improvements currently being made to underground storage tanks (USTs) will contribute to a considerable reduction in the amount of oxygenated gasoline entering water supplies. And a memo from the U.S. EPA reports that, “States have told us that USTs are their most common source of groundwater contamination and that petroleum is the most common pollutant.”²⁸

Water reservoirs can also become contaminated with MTBE as a result of exhaust from watercraft and power boats.

Nearly ten years ago, the U.S. EPA and the State Water Resources Control Board (SWRCB) formulated new regulations that require all USTs to be upgraded, replaced, or closed by December 22, 1998. Unfortunately, hundreds of tanks in California will not be able to meet that deadline.

As of April 1, 1997, only 54 percent of California’s 65,000 active tanks had been upgraded or replaced to meet the new requirements. There were 17,102 active leaks on that date -- 8,637 of which affected our drinking wells, aquifers, or groundwater. Although no state or federal agency has officially tracked leaks containing MTBE until recently, the SWRCB estimates that there could be as many as 10,000 tank sites in the state which leak MTBE.

While most of the larger UST operators have already upgraded or replaced their USTs, small business owners (“mom and pop” operators) are lagging in their compliance due to the expense. Costs of upgrading or replacing USTs can range from \$100,000 to \$200,000 per tank, but this expense will not increase the owner’s income. Current loan programs for small business owners are either exhausted or inadequate. Small business owners are also fearful that, if they upgrade their tanks, the government will pass new laws in the near future requiring them to replace their newly-upgraded tanks.

²⁷ National Reformulated Gasoline Program, *History and Overview of the Reformulated Gasoline Program: A Briefing Book for Members of Congress and Staff* (July 1997), p. 18

²⁸ Memo from Carol M. Browner, Administrator, U.S. EPA (5/14/97)

According to the California Department of Health Services, there have been relatively few cases of MTBE contaminating the state's drinking water.²⁹ In February 1997, the department adopted regulations that require public drinking water systems to monitor their sources for MTBE.

Supporters of MTBE suggest the compound may act as an early warning system for gasoline leaks because it travels faster through the ground than other gasoline chemicals. MTBE is easy to detect in water systems because of its strong taste and smell, even at extremely low levels, giving officials a warning that benzene and other aromatics are probably not far behind. **However, MTBE is extremely difficult and expensive to clean up.** In recent months, new technology has been developed which suggests that clean-up of MTBE-polluted water may be much easier and less expensive in the near future.

Although numerous testing has been done since 1969 on the health effects of MTBE, to date there is no proof that it is a human carcinogen, and it must be remembered that gasoline contains numerous other chemicals that are known to be carcinogens.

Last summer, Governor Wilson signed two bills (SB 1189 (Hayden)³⁰ and AB 592 (Kuehl)³¹) that require the state to set drinking water standards for MTBE.

Tosco Corp., the nation's largest independent gasoline refiner, announced on October 17, 1997, that MTBE should be "quickly phased out" because of its potential to contaminate drinking water supplies.³² Chevron then announced on December 1, 1997, that it is also supporting the removal of MTBE because it contaminates drinking water. Both companies say they can meet federal clean air standards by using other additives.

CONCLUSION

There appear to be more questions than answers in the debate over MTBE and other oxygenates. The primary problem, however, is simple to define – we do not know enough about MTBE to make decisions about its use. This is confirmed by the cover letter contained in the recent White House paper on oxygenates:³³

²⁹ Department of Health Services, *Summary of Sampling of Public Drinking Water Systems for MTBE*, Internet site: www.dhs.cahwnet (June 13, 1997)

³⁰ Chapter 815, *Statutes of 1997*

³¹ Chapter 814, *Statutes of 1997*

³² Sacramento Bee, "Oil firm: Halt use of gas additive" (10/29/97)

³³ *Interagency Assessment of Oxygenated Fuels* cover letter dated June 1997 from John H. Gibbons, Assistant

“Data are insufficient to complete a thorough risk assessment of the oxygenated fuels program; thus several critical issues are currently being researched by several Federal agencies.”

U.S. Representative Brian Bilbray has introduced H.R. 630 which will allow California to substitute its own clean air standards in place of federal regulations, as long as the state continues to maintain equivalent or greater reductions in emissions of toxic air pollutants as required by federal regulations. H.R. 630 does not mandate the use of any particular ingredients in California’s RFG so that California will have more flexibility in blending its gasoline. The bill has broad bipartisan support in the House of Representatives and has been cosponsored by 46 members of California’s Congressional delegation. Representative Bilbray’s office has advised that six major oil refiners also endorse his bill, and Senator Dianne Feinstein has announced that she will sponsor H.R. 630 in the Senate.

The Western States Petroleum Association has stated, “We also support efforts to repeal federal government oxygenate mandates that dictate specific amounts and types of oxygenates in gasoline.

A far more cost-effective approach is to provide refiners the flexibility to only use the amount and type of oxygenate each needs to meet the environmental specifications for cleaner-burning gasoline.”³⁴

U.S. Senator Barbara Boxer held a congressional hearing in Sacramento on December 9, 1997, and requested that the U.S. Environmental Protection Agency invoke emergency federal powers to phase out MTBE so that it will not further contaminate California’s water supplies.

Are Oxygenates Necessary?

California’s original specifications for reformulated gasoline did not include oxygenates, but federal law currently requires their use. Without oxygenates, emissions of benzene and 1,3-butadiene would increase, and there would be a decrease in the production of the finished product of gasoline. The auto and oil industry undertook a comprehensive study³⁵ on the use of oxygenates and found that:

“The addition of an oxygenate (MTBE) had no significant effects on total exhaust toxics.”

Tosco Corp. and Chevron have both stated they can meet federal clean air standards without using MTBE.

to the President for Science and Technology

³⁴ Doug Henderson, Executive Director, Western States Petroleum Association, Glendale, in a letter to the Editor of the *Sacramento Bee*, 12/11/97

³⁵ Final report of the Auto/Oil Air Quality Improvement Research Program, January 1997, *Technical Bulletin No. 17 – Gasoline Reformulation and Vehicle Technology Effects on Exhaust Emissions, August 1995.*”

What Happens if MTBE is Banned in California?

If federal regulations continue to require the use of oxygenates and if MTBE is banned in California, ethanol could be used. But the switch from MTBE to ethanol would need to be gradual because California is not ready for the conversion.

- ✓ The nation's supply of ethanol would not meet California's needs so the supply would need to be increased. Because most ethanol is produced in the Midwest, production in California would need to be developed in order to avoid transportation problems and expenses.
- ✓ California refineries would need to be refitted to accommodate the change of ingredient. The petroleum industry spent an estimated \$4 billion to refit their refineries in order to add MTBE to California's gasoline. At this time, it is unknown what the cost would be to refit the refineries in order to use ethanol. In addition, terminals would need to be restructured to allow blending at terminals instead of at refineries.
- ✓ California's supply of finished product (gasoline) would diminish unless ethanol could be blended at higher levels than the state presently allows and, if the supply diminishes, prices will undoubtedly rise.
- ✓ MTBE would no longer contaminate our drinking water sources but other gasoline ingredients, such as benzene, would continue to enter our water until the underground storage tank problem has been solved.

Appendix A

Specifications	Phase 1*	Phase 2		
		Flat	Averaging	Cap
Reid vapor pressure (psi)	7.8	7.0	7.0	7.0
Sulfur (ppmw)	151	40	30	80
Aromatic HC (vol.%,max.)	32	25	22	30
Benzene (vol.%,max.)	1.7	1.0	0.80	1.20
Olefins (vol.%,max.)	9.6	6.0	4.0	10.0
Oxygen (wt.%)**	1.8-2.2	1.8-2.2	NA	1.8 min 2.7 max
Temperature (°F, max.) at 50% distilled	212	210	200	220
Temperature (°F, max.) at 90% distilled	329	300	290	330

* Specifications are for Reid vapor pressure only. The other numbers are estimates of average values for Phase 1.

** The oxygen specification (1.8 to 2.2 percent) has been in force during winter months only since November 1992. The Phase 2 specification is year-round.